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United States Department of Agriculture - Forest Service
Washington, D.C. 20250
Issued January 1975

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RARE AND LOCAL CONIFERS IN THE UNITED STATES

by

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Little, Elbert L., Jr.
1975. Rare and local conifers in the United States. USDA Conservation Research Report 19, 25 p., illus.

Thirty-five of the 96 species of conifers native in continental United States, more than one-third, are trees of rare or local distribution. The range of each of the 35 is shown on an individual map. A table indicates the extent of preservation and distribution in public forests, parks, and other preserves, and which species are endangered. The description for each includes range, location of occurrence, rarity, forest type, and information of special interest.

OXFORD: 174.7 (73); 181.1 (73). KEY WORDS: Conifers (U.S.A.); trees (U.S.A.); rare trees (U.S.A.); trees, distribution maps.

F-51112
Cover: No. 6. Subalpine larch, *Larix lyallii.* A timberline tree in western Montana, Idaho, and Washington. Head of Stehekin River, Wenatchee National Forest, Washington.

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RARE AND LOCAL CONIFERS IN THE UNITED STATES

By Elbert L. Little, Jr.[1]

INTRODUCTION

Thirty-five of the 96 species of conifers native in continental United States, more than one-third, are trees of rare or local distribution. Fortunately, only a few are endangered or threatened with extinction at present. Increasing interest in the environment and nature in recent years has led to concern about preservation of representative areas of undisturbed vegetation and about protection of rare plants and animals from extinction. There have been many inquries and requests for lists of rare and endangered plants. This report is the first of a series on the rare and local native trees of the United States.

This preliminary compilation aims to show where each rare and local species of conifer is found and may be observed and studied, including names of National Forests, National Parks, natural areas, and other preserves. It indicates which species are endangered, which may need more protection in additional preserves, and where these areas might be established. It hopes to encourage the collection and distribution of seeds of some species and the introduction and propagation of certain rare species where desirable, not only in parks, arboreta, and botanical gardens, but also within designated areas of natural forests.

One purpose of this report is to bring the list of rare and local conifers to the attention of the officials who manage the preserves. Further, it may help land managers, especially those beginning work in the future, to become aware of the rare plants, provide for their protection, and prevent their destruction. Also, in the absence of surveys or local plant lists, this compilation may suggest that certain rare species might be expected and sought in other existing preserves within the natural range.

A few definitions may be appropriate. An *endangered* species is one whose ability to survive is seriously threatened. Small numbers of individuals, loss of or changes in habitat, overexploitation, competition, disease, or other factors could cause extinction. Survival requires assistance.

A *rare* species has small numbers of individuals throughout its range—which may be restricted or widespread—and may become endangered if environmental conditions become more adverse. The term *local* species is used here for a species of relatively small range but which is sufficiently common not to be called rare. A species whose range is limited to a particular area, usually small, is cited as *endemic. Border* or *peripheral* species reach the limit of their natural range a short distance into the United States, where they may be classed also as rare or local. Of course, these border species could become extinct in the United States and still be common and not endangered in a neighboring country.

Conifers are an ancient group of plants belonging to the gymnosperms, plants with naked seeds borne mostly in cones and without true flowers and fruits. Pine fossils (genus *Pinus*) have been found in deposits back to the Jurassic period of the Mesozoic era. The fossil record reveals that some genera of conifers have had a wider distribution over the earth's surface at times in the past than at present. Thus, the limited or spotty occurrence in scattered or isolated groves, disjunct rather than continuous, suggests old age and declining vigor against competition with newer species.

Some rare native conifers have long attracted attention. For example, a popular article listed 11 conifers among the 13 rarest tree species of the country (Anon. 1940[2]). Five of six endangered relic tree species of California in another article were conifers (Kilburn 1961).

In response to the interest in preservation of rare species, a list, containing two conifers, of rare native trees of the United States endangered by man was prepared by the author for the Inter-American Conference on the Conservation of Renewable Natural Resources in the Western Hemisphere held in Argentina in October 1965. At present, the International Union for Conservation of Nature and Natural Resources is publishing "Red Data Book" with information on endangered animal and plant species of the world. Flowering plants are covever in "Volume 5—Angiospermae" (Melville 1970), and conifers will be treated similarly in a forthcoming part.

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[2] Names and dates in parentheses refer to Literature Cited, p. 25.

Acknowledgment is due several colleagues for review of the preliminary draft of the manuscript and especially for additional information about the preserves. One comment was that several species have relatively broad ranges to be classed as local and could have been omitted. If so, perhaps the inclusion of these species may be useful for reference purposes.

This report begins with a discussion of natural areas and Federal and State lands and their relation to rare, local and endangered species. The rare and local conifers are then grouped geographically. The text consists mostly of detailed descriptions, accompanied by distribution maps, giving the range, location of occurrence, rarity, and forest type for each species. Table 1 indicates which species are endangered and the extent of their preservation and distribution in forests, parks, natural areas, and other preserves. Additional areas not mentioned here are being considered for preserves. Thus, this preliminary compilation may not be up-to-date when published.

NATURAL AREAS

The protection of endangered tree species differs from but overlaps with preservation of representative forest types or vegetation types as natural areas. Generally the rare species are too scarce to occur in groves or stands large enough to merit designation of forest cover types. However, rare species may be associated with common species and thus be minor components within a type. Thus, a natural area may serve a dual purpose of preserving an example of a cover type and also representative individuals of one or more rare species.

The occurrence of rare conifers is known for most natural areas. However, some tracts, particularly those recently designated, do not yet have plant lists or inventories and may or may not contain rare plants. Thus, no compilation has been made of all natural areas where a certain rare species is present.

A few local species of conifers listed here do form stands sufficiently common and characteristic to be classified as forest types and to be preserved as such. These forest cover types are cited below by name and number (SAF Type) following the classification of the Society of American Foresters (1954).

Undisturbed natural areas are preserved by various public and private organizations and land owners. These natural area programs, including those by professional resource management societies, Federal agencies, and States, have been reviewed recently (Romancier 1974). The Society of American Foresters (SAF 1970; Buckman and Quintus 1972) lists 281 SAF Natural Areas in 42 States and Puerto Rico, registered under different ownerships, mostly Federal and State; some universities and corporations with timber holdings, however, are represented. Likewise, the Soil Conservation Society of America has evaluated and certified more than 100 sites in 25 States as Managed Natural Areas. The Nature Conservancy, a national conservation organization, has acquired lands in more than 1000 projects throughout the country and is obtaining additional areas.

LANDS ADMINISTERED BY USDA FOREST SERVICE AND OTHER AGENCIES

Federal lands containing these rare and local species of conifers are administered mainly by the Forest Service of the U. S. Department of Agriculture and by the Department of the Interior through the National Park Service, Bureau of Land Management, and Bureau of Sport Fisheries and Wildlife, and also by other agencies. These include the Tennessee Valley Authority and the Atomic Energy Commission. Protection is given by U. S. Government ownership in the National Forests, National Parks, National Wildlife Refuges, and public domain. State parks and State forests protect some species.

More than 500 Research Natural Areas have been established on Federal lands for scientific and educational purposes, and action on others is pending. A directory compiled in 1968 listed 336 (Federal Committee on Research Natural Areas 1968). By the end of 1973 the Forest Service had 110 Research Natural Areas in 29 States and Puerto Rico. Federal Research Natural Areas in Oregon and Washington, totaling 48 in 1972, have been described in detail (Franklin, Hall, Dyrness, and Maser 1972).

A high objective in the policy of the Forest Service is to give special emphasis to protection of rare and endangered plants and animals (Forest Service 1970a). Many additional areas within the National Forest System are under several classes of special management for protection of rare plants. Research is concentrated in a series of Experimental Forests located in representative forest types over the country. A portion of each Experimental Forest generally is maintained in natural condition as a check for comparison with experiments.

The largest acreage given special protection within the National Forests is administered under the National Wilderness Preservation System, which includes areas managed also by agencies of the Department of the Interior. Under the Wilderness Act of 1964 and earlier regulations, large areas are managed in natural condition for their wilderness or primitive character without roads and commercial timber harvesting (Forest Service 1970b, 1971). As of March 1971, there were within the National Forests 60 Wildernesses totaling 9,932,327 acres and 28 Primitive Areas totaling 4,357,314 acres. Many rare plant species, especially those of scattered distribution on high mountain peaks and ranges, are protected within these boundaries.

The Forest Service administers also more than 90 Scenic Areas on the National Forests. Though preserved primarily for their scenic values and partly developed for recreation, these areas contain many good small accessible examples of natural and near natural vegetation including some rare plants. Smaller numbers of areas are classed as Historical, Archeological, Geological, Botanical, Memorial, and Virgin. Other special types are National Recreation Areas, National Wild and Scenic Rivers, and National Recreation and Scenic Trails.

The 8 Botanical Areas preserve rare plant species including a few rare conifers, groves of large trees, and rare vegetation types. The largest and best known is Ancient Bristlecone Pine Forest Botanical Area, 27,160 acres on the Inyo National Forest in California. Three other Botanical Areas contain rare conifers. Cuesta Ridge Botanical Area was established for Sargent cypress, *Cupressus sargentii.* Bodfish Botanical Area protects Piute cypress, *C. arizonica* var. *nevadensis.* Brewer spruce, *Picea breweriana,* is within Big Craggies Botanical Area.

RARE AND LOCAL CONIFERS

A list of the rare and local native conifers is readily prepared from the distribution maps of all 96 species published recently in the first volume of "Atlas of United States Trees" (Little 1971a). That reference mentions the rare and local conifers (p. 7) and is the source of the maps reproduced here. Additional maps of the native species of pine (genus *Pinus*) show ranges on larger scale and in greater detail (Critchfield and Little 1966). The general range of each species has long been available in the Forest Service checklists published since 1897. Scientific and common names used in this report follow the latest list—"Check List of Native and Naturalized Trees of the United States (Including Alaska)" (Little 1953)—with minor revisions. Two species are shrubs of wide distribution.

The native conifers of Alaska will be mentioned separately. Hawaii and the Virgin Islands have no native conifers. Puerto Rico has 1, caobilla or podocarp, *Podocarpus coriaceus* L. C. Rich., which is not rare or endangered and is found also to the Southeast in the Lesser Antilles. The rare and local trees of Puerto Rico and the Virgin Islands, including 141 endemic species confined to those islands, will be the subject of another report.

According to the maps published in the Atlas, 35 of the 96 species of conifers native in continental United States representing 13 of the 16 genera have narrow geographic distribution. Those also with relatively small numbers of individuals are classed as rare, while those common enough to form stands and named forest types are classed as local. Six of the 35 conifers are border or peripheral species, primarily Mexican, which extend northward across the boundary a short distance into Texas, New Mexico, and Arizona. Though classed as rare or local in the United States, these border species are more widespread southward in Mexico and are not endangered.

Thirteen species are illustrated in this paper by photographs of mature trees from the collection of the USDA Forest Service and are mostly from the National Forests. Besides the species on the cover, plates I, II, and III have 4 species each.

The 35 rare and local species of conifers are not distributed uniformly across the country, nor at random, but are confined mostly to certain regions or centers. They may be grouped geographically, as in the numbered descriptions and in the following tabulation, which gives the number of species and the plate number (Roman numeral) for the appropriate maps in this report.

Southern Appalachians	2,	(IV)
Florida	3,	(IV)
Rocky Mountain	2,	(V)
Texas	4,	(including 2 mainly Mexican) (V, VI)
New Mexico and Arizona	4,	(pines, *Pinus*, all mainly Mexican) (VI)
California	20	
Pines, *Pinus*	7,	(VII)
Miscellaneous conifers	6,	(VIII)
Cypresses, *Cupressus*	7,	(1 also to Texas) (IX)

Table 1 (page 22) lists by species number the 35 rare and local species of conifers and summarizes their distribution in public preserves. Plates IV-IX contain 35 maps—which correspond in assigned species number to table 1—and compare related species concisely by geographic region. Thus, table 1 serves also as a legend for the 35 maps. These same numbers are assigned to the species descriptions giving range, location of occurrence, rarity, forest type, and information of special interest.

These maps drafted by Suzanne Foster Manley are one-half the size in the Atlas volume, or scale 1/20,000,000. Thus, 1 inch equals approximately 316 miles, and 1 centimeter equals 200 kilometers.

Only 5 species are found east of the Mississippi River, 2 of these in the Southern Appalachians and 3 in Florida (or slightly beyond), as shown in plate IV. None is northeastern.

Two local species occur at the timberline at high altitudes in the Rocky Mountains, 1 northern and 1 southern (plate V). Four species are mainly in Texas, though 2 of these are local extensions of widespread Mexican trees (plates V, VI). Four species of pines, *Pinus*, from Mexico extend north into New Mexico and Arizona (plate VI). Thus, 6 are border or peripheral species.

Twenty-one of the 29 local species of conifers (excluding 6 border species), more than two-thirds, are native in some part of California. However, 3 of these have ranges mostly outside that State. California, with its great diversity of climates and physiography, has long been known as a center of endemism with numerous local plant species. Many old plant groups have persisted there. Eight of the California species are pines, *Pinus* (plates V and VII), 6 are miscellaneous conifers in as many genera (plate VIII), and 7 are cypresses, *Cupressus* (plate IX). After these maps were prepared, larger distribution maps, showing greater detail, were published for the rare and local conifers in California (Griffin and Critchfield 1972).

Two well known coniferous genera of giant trees are endemic to California, each surviving as a single species but having fossil relatives of broad geographic distribution. Giant sequoia, *Sequoiadendron*, is included here. However, redwood, *Sequoia sempervirens* (D. Don) Endl., also in extreme southwestern Oregon, is omitted. That commercially valuable timber tree is widespread within National and State Forests and Parks. It has its own special organization, Save-the-Redwoods League, 114 Sansome Street, Room 605, San Francisco, California 94104.

F-436128

Plate I. Four western pines. Upper left, No. 16. Foxtail pine, *Pinus balfouriana*. Subalpine zone in Sierra Nevada, Sequoia National Forest, California.

F-506371

Upper right, No. 7. Bristlecone pine, *Pinus aristata*. *The Patriarch*, largest of its species, with many trunks. Ancient Bristlecone Pine Forest Botanical Area, Inyo National Forest, California.

F-40072

Lower left, No. 17. Coulter pine, *Pinus coulteri*, the pine with the heaviest cones. Cleveland National Forest, California.

F-235349

Lower right, No. 21. Torrey pine, *Pinus torreyana*. Torrey Pines State Park, north of San Diego, California.

Southern Appalachians

Two species of conifers mentioned in this section are local in the Southern Appalachian Mountains though not rare (plate IV). Another conifer endemic in this region is Table-Mountain pine, *Pinus pungens* Lamb. (Little 1971b). It has been omitted because of its somewhat wider range in 9 States from Pennsylvania to Georgia.

1. Fraser fir, *Abies fraseri* (Pursh) Poir. (Plate II.) Confined to high altitudes in Southern Appalachian Mountains of southwestern Virginia (5 counties), western North Carolina (10 counties), and eastern Tennessee (3 counties). A dominant species of the red spruce–Fraser fir forest type (SAF Type 34) and common locally, mostly within publicly owned lands. National Forests: Jefferson in Virginia, Pisgah and Nantahala in North Carolina, and Cherokee in Tennessee. Areas within National Forests: Mount Rogers Research Natural Area (Jefferson), Black Mountain Research Natural Area (No. 19 in Federal Committee on Research Natural Areas 1968; Pisgah), and the Unaka Mountain Scenic Area (Cherokee). The last is described as essentially a virgin remnant of the red spruce–Fraser fir forest type. Great Smoky Mountain National Park and its Three Forks Natural Area, North Carolina and Tennessee, and Blue Ridge Parkway, North Carolina. Mount Mitchell State Park, North Carolina. Accessible and easily seen from highways in parks. Planted as a Christmas tree, having snowy whitish lower surfaces of needles. This species is attached by balsam woolly aphid (*Chermes piceae*).

2. Carolina hemlock, *Tsuga caroliniana* Engelm. High altitudes in Southern Appalachian Mountains in 5 States: southwestern Virginia (11 counties); western North Carolina (26 counties); northeastern Tennessee (4 counties); northwestern South Carolina (3 counties); and northeastern Georgia (2 counties). Mostly within 5 National Forests: Jefferson in Virginia; Pisgah and Nantahala in North Carolina; Cherokee in Tennessee; and Chattahoochee in South Carolina and Georgia. Also Blue Ridge Parkway under National Park Service, Virginia and North Carolina. Rare and scattered; distribution summarized by R. L. James (1959).

Florida

Three species of conifers are confined to Florida or slightly beyond (plate IV; C. W. James 1961). Also, South Florida slash pine, *Pinus elliottii* Engelm. var. *densa* Little & Dorman, is an endemic variety in southern Florida including several of the Lower Florida Keys and north along coasts to the central part of the State. Representative stands are preserved within Everglades National Park, National Key Deer Refuge, and State parks.

Two species of the yew family, Taxaceae, are very rare in northwestern Florida on the east side of the Apalachicola River and vicinity. Following their discovery more than a century ago, several generations of field botanists have visited the site.

3. Sand pine, *Pinus clausa* (Chapm.) Vasey. (Plate II.) Confined to Florida and Baldwin County, Alabama, and dominant in the sand pine type (SAF Type 69). Local but not rare. Represented within Ocala National Forest and its Alexander Springs Creek Scenic Area.

4. Florida yew, *Taxus floridana* Nutt. Very rare, very limited, and endangered. Gadsden and Liberty Counties, northwestern Florida, in the same general area as the next species. Known only from wooded slopes and ravines for 15 miles along the eastern side of Apalachicola River north of Bristol and from a swamp forest 8 miles southeast of Bristol. Torreya State Park about 10 miles north of Bristol. Small plants are growing in the National Arboretum at Washington, D.C.

5. Florida torreya, *Torreya taxifolia* Arn. Very rare, very limited, endangered, and almost extinct in the wild state. Northwestern Florida (Gadsden, Liberty, and Jackson Counties) and southwestern Georgia (Decatur County). Bluffs, wood slopes and ravines along

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F–490492

Plate II. Two eastern and two western conifers. Upper left, No. 3. Sand pine, *Pinus clausa*. Confined to Florida and Baldwin County, Alabama. A tree at Gainesville.

F–409177

Upper right, No. 25. Brewer spruce, *Picea breweriana*. Another name, weeping spruce, describes the odd, drooping foliage. Gold Basin Range, Siskiyou National Forest, Oregon.

F–5112

Lower left, No. 1. Fraser fir, *Abies fraseri*. A large tree in high mountains of North Carolina.

F–190333

Lower right, No. 23. Bristlecone fir, *Abies bracteata*. This unique fir is a native only in Santa Lucia Mountains within Los Padres National Forest, California.

the eastern side of Apalachicola River from Chattahoochee south to near Bristol. Also one small colony west of the river at Dog Pond southwest of Lake Ocheesee in Jackson County. Found also in two or three ravines north of State line on the bluff east of Flint River near its junction with Chattahoochee River, Decatur County, southwestern Georgia. However, some of the trees in Georgia may have been submerged by Lake Seminole, which was formed along these rivers by Jim Woodruff Dam. It is reported that others have been planted nearby. Torreya State Park was established to protect this and the preceding species. Florida torreya is now almost extinct in its natural habitat, having been destroyed by a fungal disease of the stems, according to R. K. Godfrey and Herman Kurz (1962). They recommended immediate propagation of seedlings or cuttings or both and planting in widely separated places to escape infection. They reported a few trees in cultivation, including two at Maclay (formerly Killearn) Gardens State Park near Tallahassee. The National Arboretum at Washington, D.C., has distributed seeds to botanical gardens. The small plants growing there apparently are hardy.

Rocky Mountains

Two timberline tree species of high altitudes in the Rocky Mountains have scattered distribution on mountain peaks and ranges can be classed as local though not rare (plate V).

6. Subalpine larch, *Larix lyallii* Parl. (See cover photograph.) Local and scattered in high mountains at and near timberline, mostly within 12 National Forests as follows: western Montana, 5; northern Idaho, 4; and north central Washington, 3. Glacier Peak and Pasayten Wildernesses in northern Washington; Selway-Bitterroot Wilderness in Idaho-Montana; Bob Marshall, Cabinet Mountains and Anaconda-Pintlar Wildernesses, in Montana. Salmon River Breaks Primitive Area, Idaho. Also these Scenic Areas in northwestern Montana: Ten Lakes on Kootenai National Forest and Northwest Peaks on Kootenai and Kaniksu National Forests. Glacier National Park, Montana, and North Cascades National Park, Washington. Also Lake Chelan National Recreation Area, administered by the National Park Service.

7. Bristlecone pine, *Pinus aristata* Engelm. (Plate I.) Local and widely scattered in high mountains near timberline, consisting of 2 geographical variations. (The variation in Utah, Nevada, and eastern California has been named *Pinus longaeva* D. K. Bailey.) Mostly within 7 or more National Forests in 6 States, as follows: Colorado, 7; New Mexico, 2; Arizona, 1; Utah, 4; Nevada, 2; and California, 1. Dominant in the bristlecone pine type (SAF Type 209). The Ancient Bristlecone Pine Forest Botanical Area within Inyo National Forest, California, contains trees as old as 4,600 years, the oldest known dated living trees, as well as logs more than 2,000 years older. Another grove of ancient age is in Wheeler Peak Scenic Area, Humboldt National Forest, Nevada.

Bristlecone pine grows within the Wheeler Peak and Pecos Wildernesses in northern New Mexico and the following Research Natural Areas within the National Forests: Goliath (No. 58 in Federal Committee on Research Natural Areas 1968) in Colorado, San Francisco Peaks (No. 65) in Arizona, White Mountain (No. 73) in California, and perhaps others. Scenic Areas: Windy Ridge–Bristlecone Pine in Colorado; C. Hart Merriman in Arizona; probably Mount Timpanogos in Utah; and probably Ruby Mountain in Nevada. Bristlecone pine is within Bryce Canyon National Park, Utah, and Zion National Park, Utah, and its Amphitheater Natural Area (No. 285). The Bureau of Land Management has Heusser Mountain Bristlecone Pine Natural Area (No. 72) in Nevada. The Hayford Peak Natural Area (No. 71), within the Desert National Wildlife Refuge in Nevada, is under the Bureau of Sport Fisheries and Wildlife.

F-48667

Plate III. Four conifers with scalelike leaves. Upper left, No. 34. Monterey cypress, *Cupressus macrocarpa*. Point Cypress on Pacific Ocean near Monterey, California.

F-44322

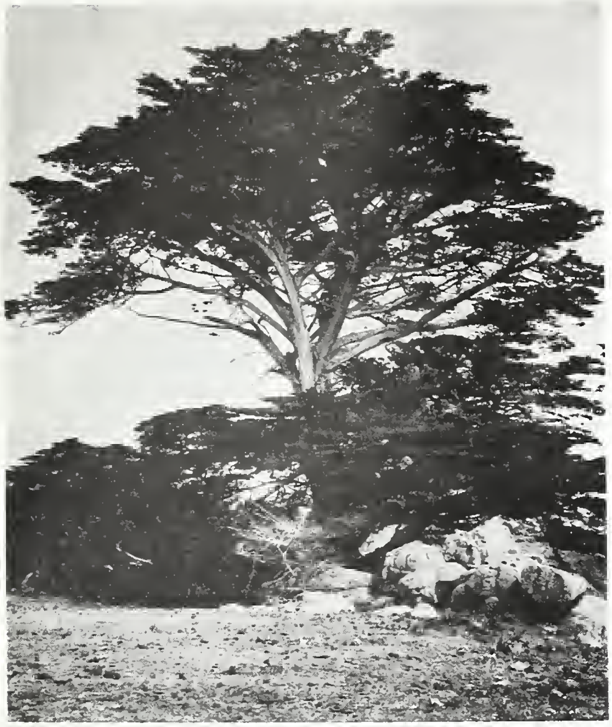
Upper right, No. 9. Pinchot juniper *Juniperus pinchoti*. Named for Gifford Pinchot (1865–1946), distinguished American Forester and statesman and the first chief of the United States Forest Service. Palo Duro Canyon State Park, Texas.

F-175363

Lower left, No. 33. MacNab cypress, *Cupressus macnabiana*. On divide between Cobbs and Hopeland, Lake County, California.

F-436118

Lower right, No. 27. Giant sequoia, *Sequoiadendron giganteum*. Frank Boole tree, one of the world's largest in volume of wood, in Boole Tree Grove, Converse Basin, Sequoia National Forest, California.



Texas

Four species of Texas conifers are classed as rare or local (plates V, VI). Two are border or peripheral species which barely cross the border from Mexico. The other 2 are junipers of local distribution also in nearby States and have become less common because of eradication in conversion of woodland vegetation to grazing lands.

8. Ashe juniper, *Juniperus ashei* Buchholz. Local and scattered in Ozark Mountains of southern Missouri (4 counties), northern Arkansas (11 counties), northeastern Oklahoma (1 county), Arbuckle Mountains of southern Oklahoma (5 counties), and central and southwestern Texas (many counties). Also in northern Mexico. Characteristic of limestone cliffs. Forming thickets or "cedar brakes" in the Edwards Plateau in central Texas; common but eradicated over large areas managed for grazing. National Forests: Mark Twain in Missouri and Ozark in Arkansas, including Sylamore and Henry R. Koen Experimental Forests in Arkansas. Arbuckle Recreation Area in Oklahoma under National Park Service.

9. Pinchot juniper, *Juniperus pinchotii* Sudw. (Plate III.) Central Texas to panhandle and Trans-Pecos Texas. Also in western Oklahoma (6 counties) and southeastern New Mexico (1 county). Common but eradicated over large areas managed for grazing. Palo Duro Canyon State Park (Randall and Armstrong Counties), Texas. Carlsbad Caverns National Park and Lincoln National Forest, Eddy County, New Mexico.

10. Drooping juniper, *Juniperus flaccida* Schlecht. In the United States known only from Chisos Mountains within Big Bend National Park, Brewster County, Texas. Common and widespread in Mexico.

11. Montezuma baldcypress, *Taxodium mucronatum* Ten. In the United States rare and known only from Rio Grande valley in Cameron and Hidalgo Counties, extreme southern Texas. The Texas groves of this border species apparently are in private ownership. Thus this species may be the only one listed here that is not protected within a preserve. Common and widespread in Mexico south to Guatemala.

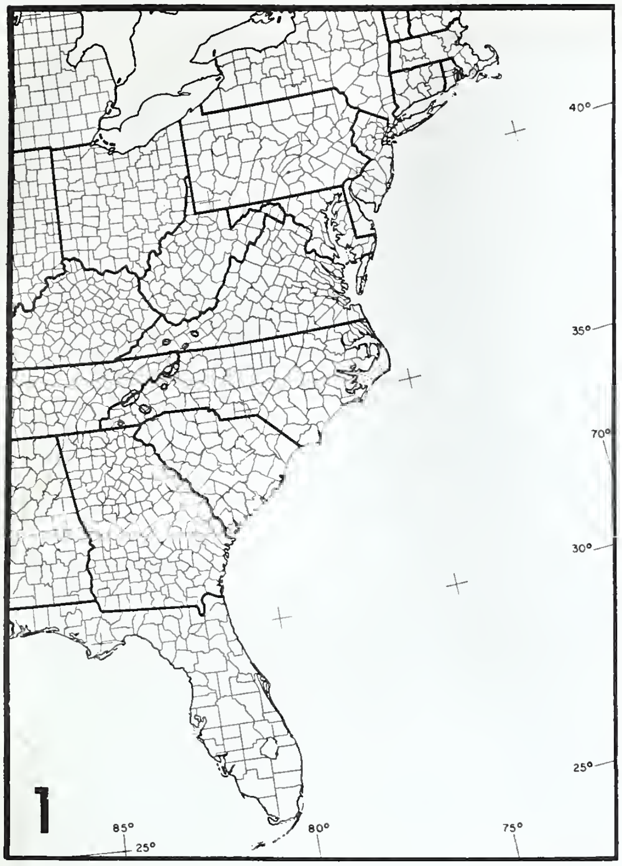
New Mexico and Arizona

Four species of Mexican pines extend north into mountains of southwestern New Mexico and southeastern Arizona (plate VI). These border or peripheral species are rare or local in the United States, though common in Mexico and obviously not endangered. Arizona pine, *Pinus ponderosa* Laws. var. *arizonica* (Engelm.) Shaw, a border or peripheral variety in the same region, is not mapped here. This local variety of the widespread species ponderosa pine (*P. ponderosa* Laws.) is within these Natural Areas, all in Arizona: Butterfly Peak, Pole Bridge Canyon, and Santa Catalina, within the Coronado National Forest, and West Pickett Park within the Coronado National Monument.

12. Mexican pinyon, *Pinus cembroides* Zucc. Scattered and rare in Edwards Plateau and mountains of Trans-Pecos Texas including Big Bend National Park; also local in southwestern New Mexico including Gila National Forest and southeastern Arizona on Coronado and Apache National Forests and Chiricahua National Monument. Probably within Chiricahua Wilderness. Also common in Mexico. This is 1 of 4 pinyon species in the pinyon-juniper woodland (SAF Type 239). The privately owned stands on the Edwards Plateau in 6 counties of Texas represent a local or endemic but not endangered variety, Texas pinyon, var. *remota* Little. The typical variety, var. *cembroides*, is in Trans-Pecos Texas, including Big Bend National Park and its Pine Canyon Natural Area. The pinyons of this species in New Mexico and Arizona belong to a third variety also in adjacent northern Mexico, var. *bicolor* Little. The last is within Pole Bridge Canyon Natural Area on the Coronado National Forest and within West Picket Park Natural Area of Chiricahua National Monument, both in Arizona.

13. Apache pine, *Pinus engelmannii* Carr. In the United States, rare and confined to mountains within Coronado National Forest including Chiricahua Wilderness in southeastern Arizona, also 1 locality in southwestern New Mexico. Butterfly Peak and Pole Bridge Canyon Natural Areas within Coronado National Forest. Common in northern Mexico.

Plate IV. Southern Appalachians and Florida. Figure 1.—Fraser fir, *Abies fraseri*. Figure 2.—Carolina hemlock, *Tsuga caroliniana*. Figure 3.—sand pine, *Pinus clausa*. Figure 4.—Florida yew, *Taxus floridana*. Figure 5.—Florida torreya, *Torreya taxifolia*.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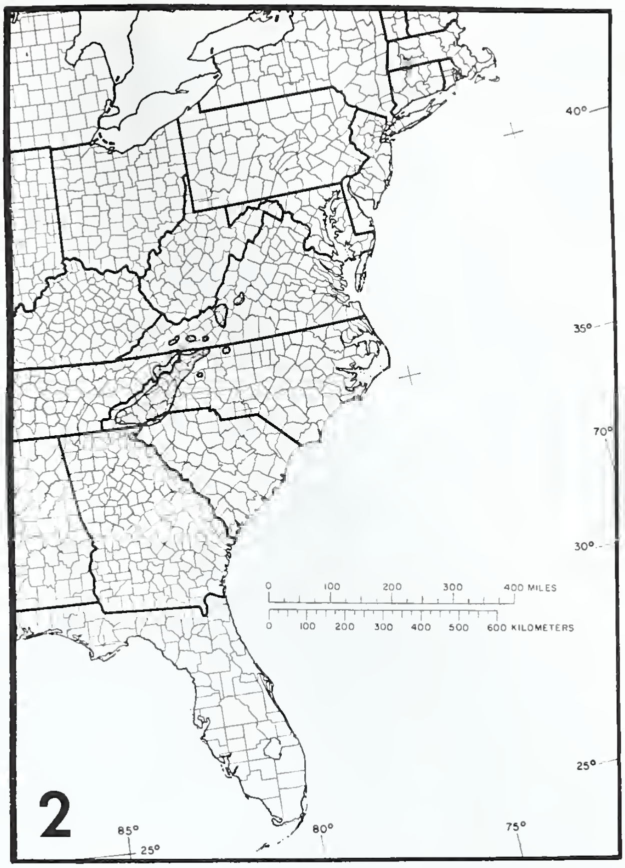
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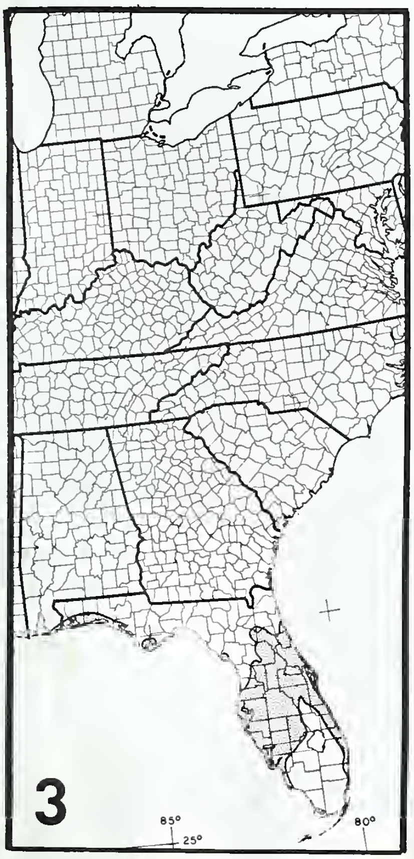
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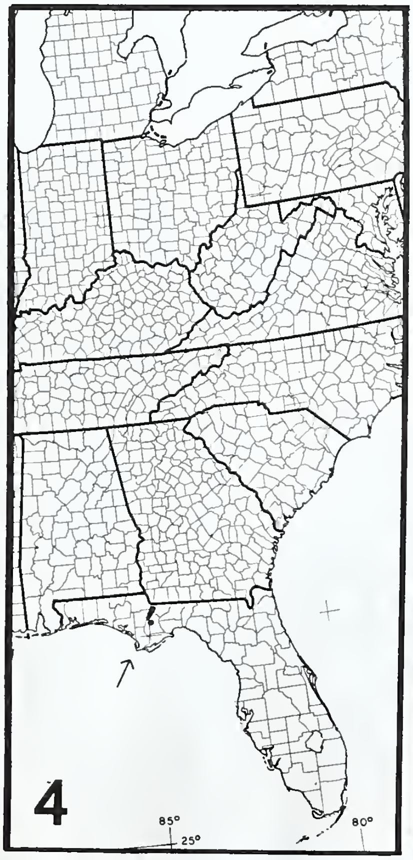
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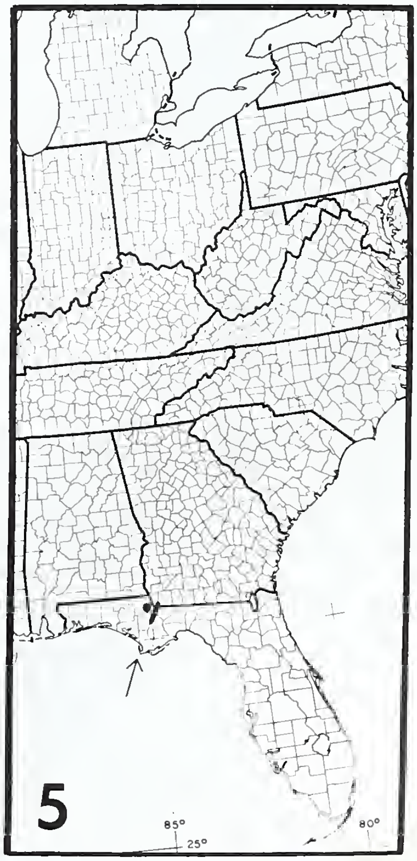
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14. Chihuahua pine, *Pinus leiophylla* Schiede & Deppe var. *chihuahuana* (Engelm.) Shaw. Rare in mountains of southwestern New Mexico, mostly on Gila National Forest, and southeastern to east central Arizona, mostly on Coronado National Forest, also Tonto National Forest. Chiricahua and Galiuro Wildernesses in Arizona. Butterfly Peak, Pole Bridge Canyon, and Santa Catalina Natural Areas within Coronado National Forest. This variety and the typical variety (var. *leiophylla*) are common and widespread in Mexico.

15. Southwestern white pine, *Pinus strobiformis* Engelm. Local and scattered in Guadalupe and Davis Mountains of Trans-Pecos Texas including Guadalupe Mountains National Park, mountains of southern New Mexico, and mountains of southeastern and east central Arizona. Also common in northern Mexico. Mostly within Lincoln, Cibola, and Gila National Forests in New Mexico and Coronado, Apache, Sitgreaves, and Coconino National Forests in Arizona. White Mountain and Gila Wildernesses in New Mexico and Chiricahua Wilderness in Arizona. Black Range Primitive Area in New Mexico. Butterfly Peak, Pole Bridge Canyon, and Santa Catalina Natural Areas within Coronado National Forest.

California Pines

Eight of the 19 species of pine, *Pinus,* native in California are local or rare (plate VII). One of these, bristlecone pine, *Pinus aristata* Engelm., has been mentioned under Rocky Mountains (figure 7 on plate V). Others with slightly broader range and omitted here are Digger pine, *Pinus sabiniana* Dougl., and knobcone pine, *Pinus attenuata* Lemm.

16. Foxtail pine, *Pinus balfouriana* Grev. & Balf. (Plate I.) Local near timberline of high mountains in 2 widely separated regions of California. The northern part is in Siskiyou, Trinity, and Tehama Counties within Klamath, Shasta, Trinity, and Mendocino National Forests; also Marble Mountain and Yolla-Bolly—Middle-Eel Wildernesses and Salmon Trinity Alps Primitive Area. The part in southern Sierra Nevada is in Fresno, Tulare, and Inyo Counties within Kings Canyon and Sequoia National Parks and Inyo and Sequoia National Forests.

17. Coulter pine, *Pinus coulteri* D. Don. (Plate I.) This species, with the heaviest cones of all pines, is scattered and local in foothills and mountains mostly near the Pacific Coast in 12 counties from central California south into northern Baja California, Mexico. It is represented within 4 National Forests: Los Padres, Angeles, San Bernardino, and Cleveland. Within these Wildernesses and perhaps others: Ventana, San Rafael, San Gabriel, and San Gorgonio. Agua Tibia Primitive Area.

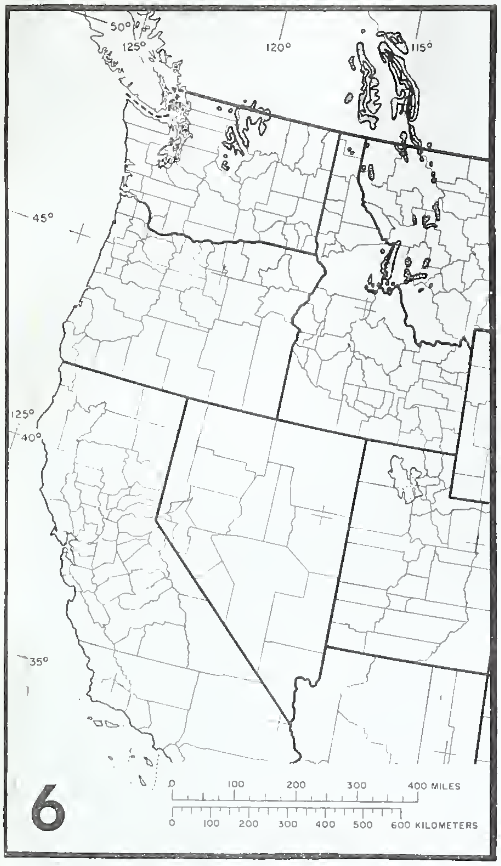
18. Bishop pine, *Pinus muricata* D. Don. Local along Pacific Coast of California (7 counties) from Humboldt to Santa Barbara County. Also Santa Rosa and Santa Cruz Islands. Also northwestern Baja California at 1 locality and on Cedros Island. S. F. B. Morse Botanical Reserve.

19. Parry Pinyon, *Pinus quadrifolia* Parl. Rare in mountains of southern California, mostly within San Bernardino National Forest in Riverside County and Cleveland National Forest in San Diego County. More widespread but not common in northern Baja California. This is the rarest of the 4 pinyon species in the pinyon–juniper woodland (SAF Type 239).

20. Monterey pine, *Pinus radiata* D. Don. Rare and restricted at 3 localities on the Pacific Coast in Santa Cruz, Monterey, and San Luis Obispo Counties. Also Guadalupe Island off the northwest coast of Baja California. Part of the grove at Monterey is preserved within Point Lobos Reserve. Monterey pine is widely planted on city streets and lots in the Monterey Peninsula. This species is grown extensively in forest plantations in the southern hemisphere and thus is not threatened with extinction.

21. Torrey pine, *Pinus torreyana* Parry. (Plate I.) Very rare on Pacific Coast at north edge of San Diego near Del Mar in San Diego County, also on Santa Rosa Island. Most of the mainland grove of about 1,092 acres and more than 7,000 trees is preserved within the recently enlarged Torrey Pines State Park. The Torrey Pines Association, La Jolla, Calif., has a conservation program. This distinctive species adjacent to densely populated areas may be endangered by air pollution and should be propagated elsewhere.

Plate V. Rocky Mountains to Texas. Figure 6.—subalpine larch, *Larix lyallii.* Figure 7.—bristlecone pine, *Pinus aristata.* Figure 8.—Ashe juniper, *Juniperus ashei.* Figure 9.—Pinchot juniper, *Juniperus pinchotii.*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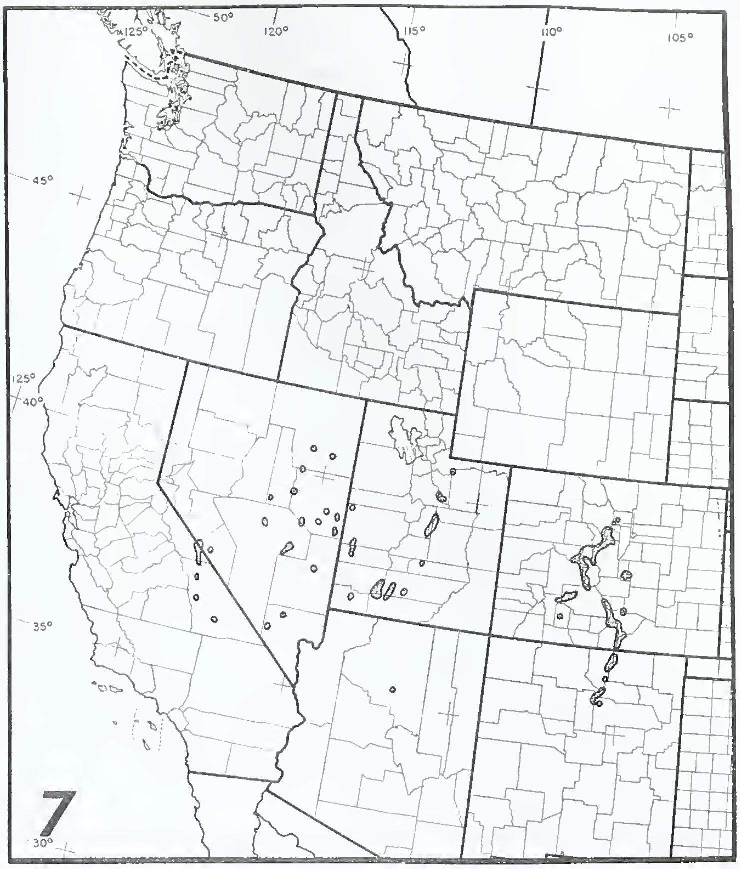
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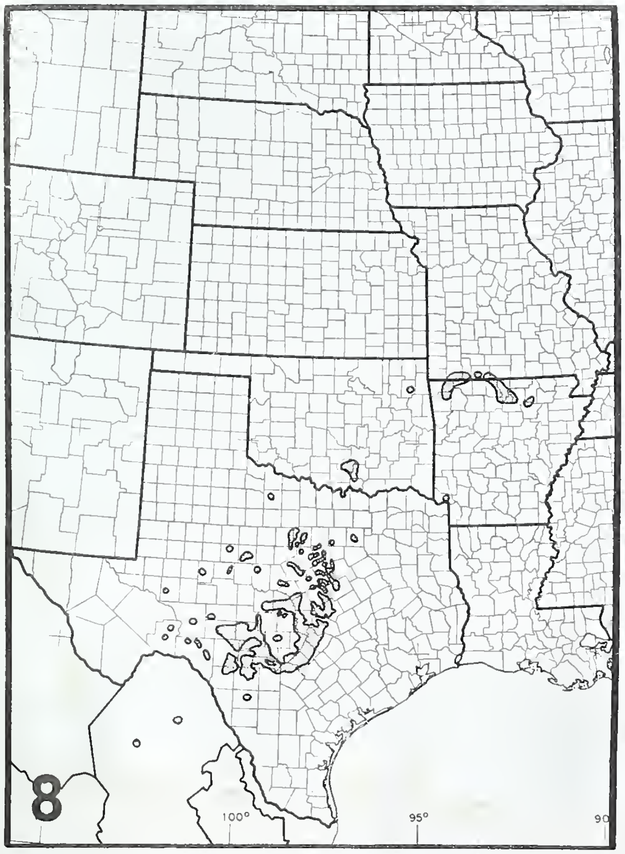
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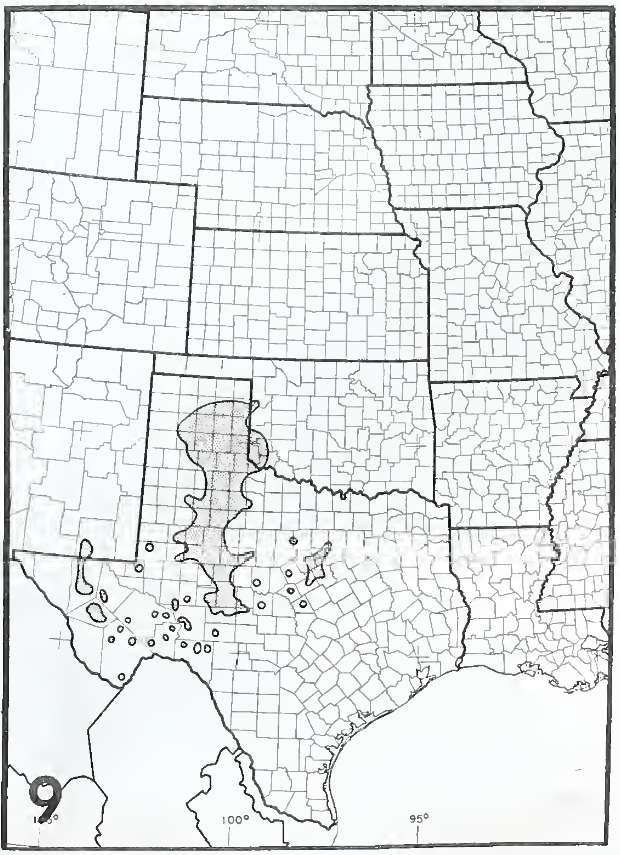
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22. Washoe pine, *Pinus washoensis* Mason & Stockwell. Very rare and restricted, discovered at Mt. Rose, Toiyabe National Forest, Washoe County, Nevada, and found afterwards at 3 areas in mountains of northeastern California —Warner Mountains, Modoc National Forest, apparently within South Warner Wilderness, Modoc County; Plumas National Forest, Plumas County; and Lassen Volcanic National Park, Lassen County.

California Miscellaneous Conifers

Seven species of miscellaneous conifers of California, each in a different genus, are rare or local (plate VIII).

23. Bristlecone fir, *Abies bracteata* D. Don, also called Santa Lucia fir. (Plate II.) Rare and confined to Santa Lucia Mountains within the Monterey Ranger District, Los Padres National Forest, Monterey County, and extreme northwestern San Luis Obispo County, California. This unique fir, isolated from all related species, is one of the most distinct native conifers and may be surviving here as a relic of former wider range. It has been placed in a separate subgenus because of great differences from other true firs of the world. The entire natural range of this most restricted of all firs is within a strip about 60 miles long and 13 miles wide. Eleven localities along both slopes of the outer coast range were cited by Jepson (1910). Each area has no more than a few hundred trees. About two-thirds of the more northern groves are within Ventana Wilderness Area. They are apparently not endangered unless perhaps by forest fires. This handsome ornamental merits wider propagation in mild climates.

24. Port-Orford-cedar, *Chamaecyparis lawsoniana* (A. Murr.) Parl. This commercially important timber species is common but threatened and possibly endangered by a fungus disease. The local distribution is mostly near the Pacific Coast in 5 counties of southwestern Oregon and 5 of northwestern California. Large areas are within the Siskiyou, Six Rivers, Klamath, and Trinity National Forests and isolated groves also in Siuslaw and Shasta National Forests. Dominant in the Port-Orford-cedar—Douglas-fir type (SAF Type 231). This species is designated in the Port-Orford-Cedar (No. 11) and Coquille River Falls (No. 110) Research Natural Areas, both on the Siskiyou National Forest in Oregon and in Brewer Spruce Natural Area (No. 222), Josephine County, Oregon, Bureau of Land Management. Wild trees are threatened by a root rot disease caused by fungi (*Phytophthora lateralis* and *Ph. cinnamomi*), the first parasite also attacking foliage and causing stem cankers. Under the name Lawson cypress, this species is a popular ornamental in humid climates, for example, western Europe. Many horticultural varieties have been developed.

25. Brewer spruce, *Picea breweriana* S. Wats. (Plate II.) Rare and restricted to 5 counties of northwestern California and Josephine and Curry Counties, southwestern Oregon, centering in the Siskiyou Mountains. The range is mostly within the Six Rivers, Klamath, and Trinity National Forests of California and the Siskiyou and Rogue River National Forests of Oregon. In California, within Marble Mountain Wilderness and Salmon Trinity Alps Primitive Area. Within the Big Craggies Botanical Area and apparently also the Kalmiopsis Wilderness, both on the Siskiyou National Forest. Brewer Spruce Natural Area (No. 222), Josephine County, Oregon, Bureau of Land Management.

26. Bigcone Douglas-fir, *Pseudotsuga macrocarpa* (Vasey) Mayr. Restricted to mountains of 8 counties of southern California, mostly within Los Padres, Angeles, San Bernardino, and Cleveland National Forests. Found mainly in the canyon live oak forest (SAF Type 249). San Rafael Wilderness and apparently also within San Gabriel, Cucamonga, San Gorgonio, and San Jacinto Wildernesses. Agua Tibia Primitive Area. Apparently within Black Mountain Scenic Area, San Bernardino National Forest.

27. Giant sequoia, *Sequoiadendron giganteum* (Lindl.) Buchholz, known also as Sierra redwood. (Plate III.) This rare species is famous for the most massive trees of the world, that is, largest in bulk and weight, as well as

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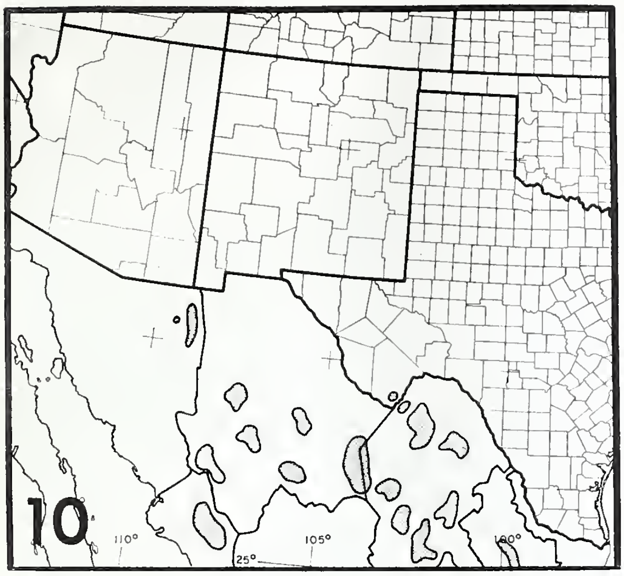
Plate VI. Texas, New Mexico, and Arizona. Figure 10.—drooping juniper, *Juniperus flaccida*. Figure 11.— Montezuma baldcypress, *Taxodium mucronatum*. Figure 12.—Mexican pinyon, *Pinus cembroides*. Figure 13.—Apache pine, *Pinus engelmannii*. Figure 14.—Chihuahua pine, *Pinus leiophylla* var. *chihuahuana*. Figure 15. Southwestern white pine, *Pinus strobiformis*.



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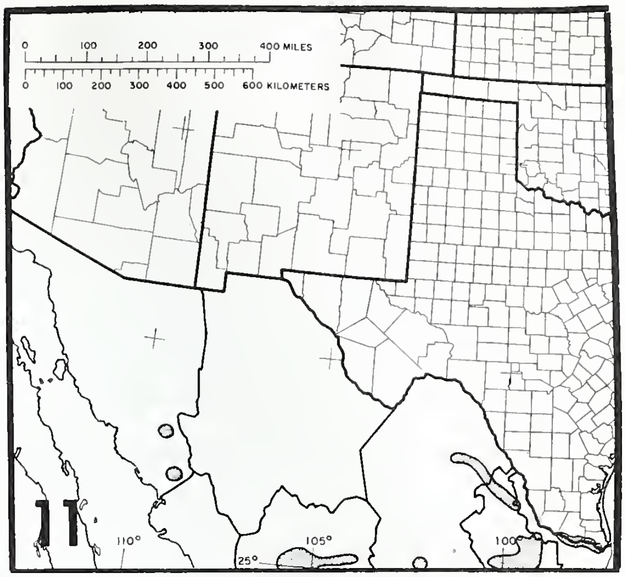

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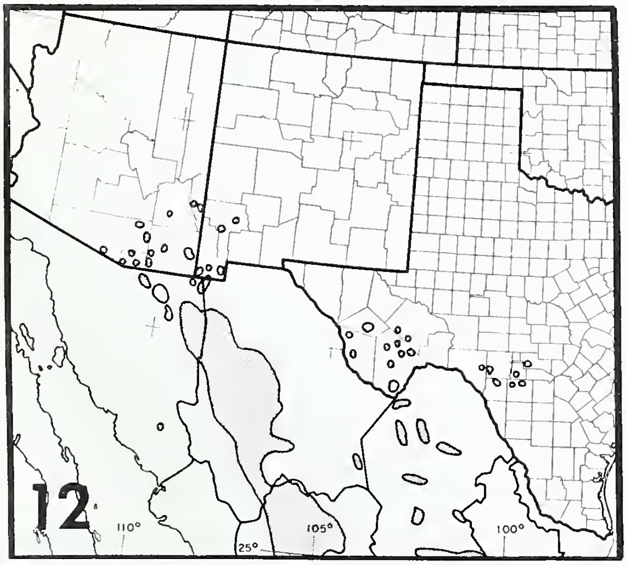

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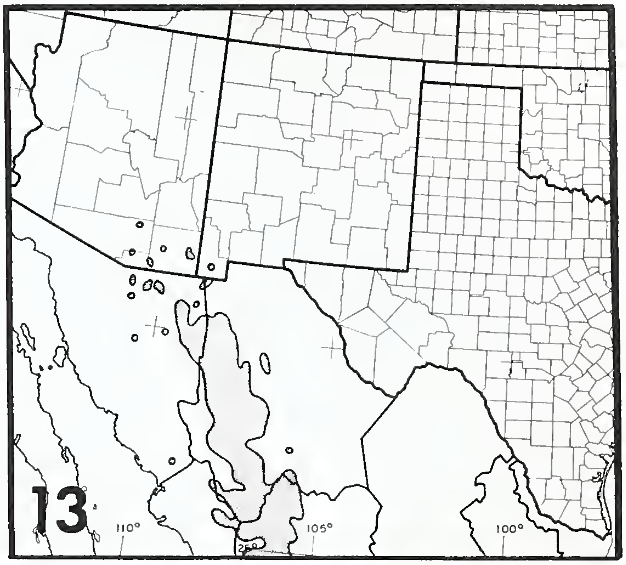

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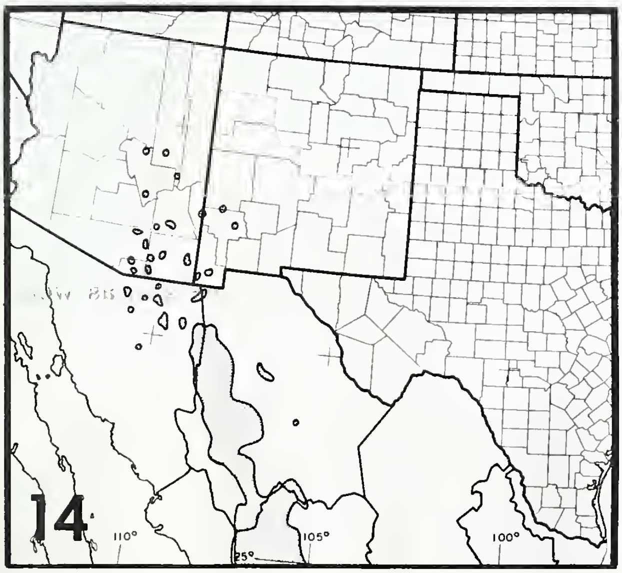

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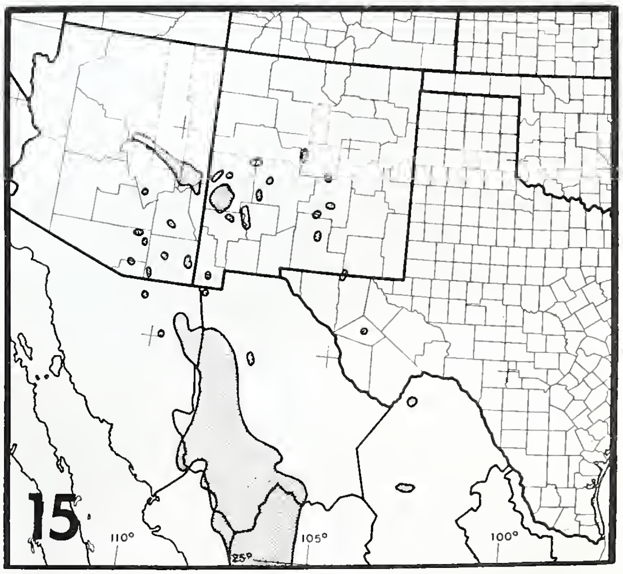

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among the tallest and oldest. It is rare and local in 7 counties along California's Sierra Nevada for 270 miles. The 70 carefully mapped scattered groves in public ownership total 36,000 acres and represent 99 percent of all the wild trees. These Government preserves are: 4 National Forests—Eldorado, Stanislaus, Sierra, and Sequoia; 3 National Parks—Yosemite, Kings Canyon, and Sequoia; and Calaveras Big Trees State Park. Also State Forest and University Forest. Groves of giant sequoias are within a large recently proposed Wilderness Area in Sequoia and Kings Canyon National Parks. The trees are not cut for lumber.

28. California torreya, *Torreya californica* Torr. Rare and scattered in mountains of California, mostly within National Forests in Sierra Nevada (11 or more counties) and Coast Range (11 or more counties). Eight National Forests: Mendocino, Lassen, Plumas, Tahoe, Eldorado, Stanislaus, Sierra, Sequoia. Also Lassen, Yosemite, and Sequoia National Parks. Perhaps protected also within other areas.

Cypresses

Cypresses (genus *Cupressus*) is the rarest group of native conifers. The entire natural range of the genus in the United States is shown in the 7 maps which plate IX comprises. This ancient coniferous genus, which had wider distribution in the fossil record, is represented now by many disjunct scattered or isolated, apparently relic populations or groves, few enough to be counted.

As interpreted in this publication, 7 species of cypress are native in the United States, all found in California. Four other States, Oregon, Arizona, New Mexico, and Texas, have 1 species each. After further division of 3 species into geographic varieties, 12 taxonomic groups or taxa were distinguished and mapped separately by Little (1970), who mentioned preservation of cypress groves.

These 12 cypresses were accepted as species in the comprehensive monograph of the genus by Wolf (1948). That reference contains an excellent detailed summary of the individual groves, including exact location and size, except for a few discovered afterwards. Also there is much practical horticultural information, including results of numerous test plots and evaluation of the different kinds for planting in California.

All 12 taxonomic groups of cypresses native in the United States are rare and merit preservation. Wolf (1948, p. 9–16) noted that cypresses have very limited areas and are endangered by man. He made a plea for preservation and protection of some of these stands and cited the most outstanding grove or station of each kind. He stated:

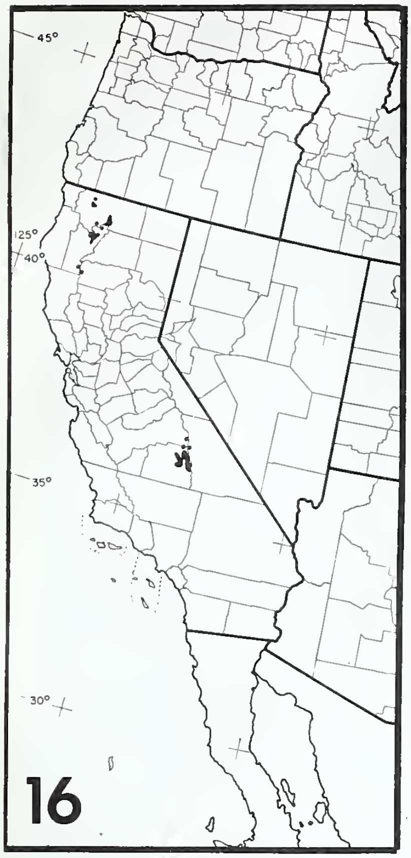
"The total areas now occupied by cypresses in North America are so limited that it would be perfectly feasible to set the major portion of them (at least those stands in the United States) apart as cypress reserves where grazing, excessive cutting or other destructive agencies could be eliminated and adequate measures for protection from fire provided."

Wolf and others have noted that cypresses are adapted to survive fire, like certain pines. After persisting tightly closed on the trees several years, the cones open in the heat of an infrequent forest fire which also kills the trees and ground vegetation. Then the seeds fall, germinate on the exposed soil, and produce thickets of young cypresses of another generation of trees.

29. Arizona cypress, *Cupressus arizonica* Greene. In the broad sense this species is composed of 5 geographic varieties (or species), the typical variety from Arizona to Texas and northern Mexico, 1 variety confined to Arizona, 2 to California, and 1 to northern Baja California. The last, San Pedro Mártir cypress, var. *montana* (Wiggins) Little (*C. montana* Wiggins; fig. 29 M), is confined to Sierra San Pedro Mártir and is protected within a National Park of Mexico. The other 4 varieties (or species) are mentioned separately below. The trees are found in nearly pure stands in the Arizona cypress forest type (SAF Type 240).

29 A. Arizona cypress (typical) or Arizona rough cypress, *Cupressus arizonica* Greene var. *arizonica*. In Texas limited to 2 groves in Chisos Mountains, both protected within Big Bend National Park. One stand has been recorded from

Plate VII. California pines. Figure 16.— Foxtail pine, *Pinus balfouriana*. Figure 17.—Coulter pine, *Pinus coulteri*. Figure 18.—bishop pine, *Pinus muricata*. Figure 19.—Parry pinyon, *Pinus quadrifolia*. Figure 20.—Monterey pine, *Pinus radiata*. Figure 21.—Torrey pine, *Pinus torreyana*. Figure 22.—Washoe pine, *Pinus washoensis*.



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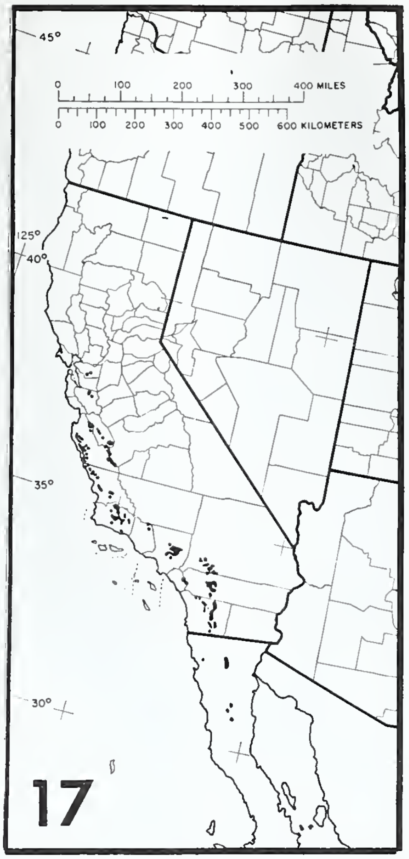

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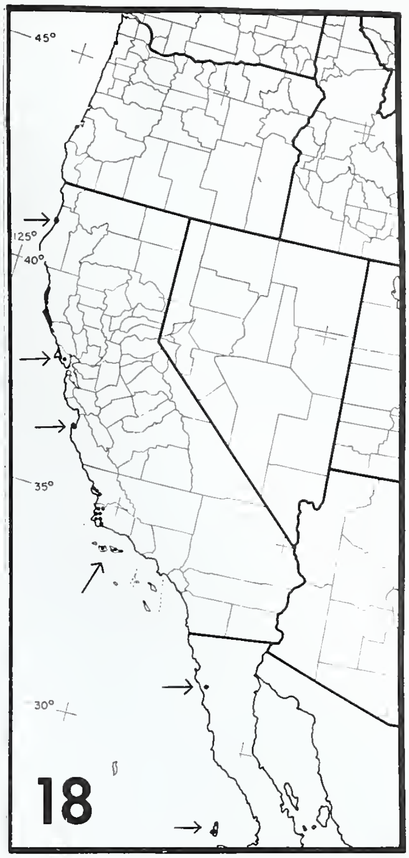

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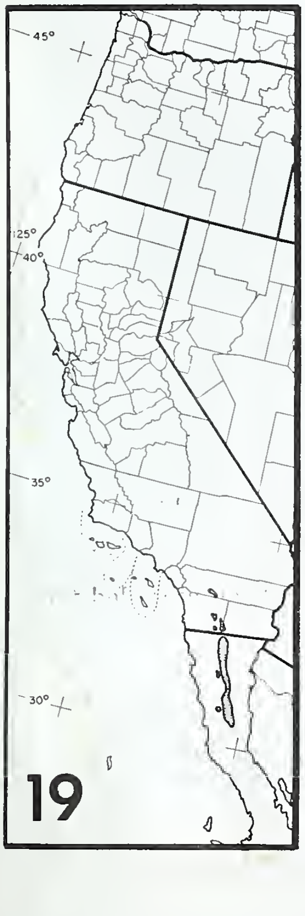

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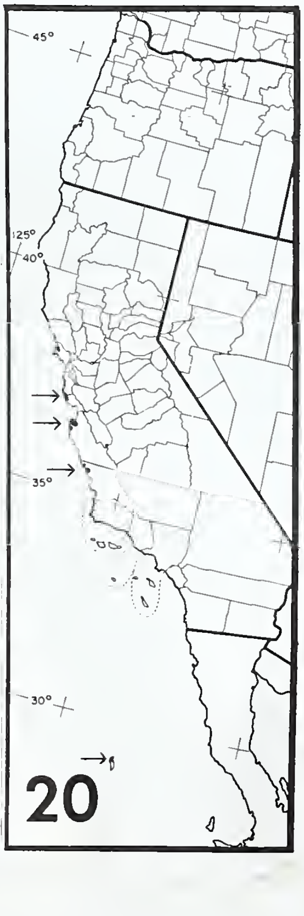

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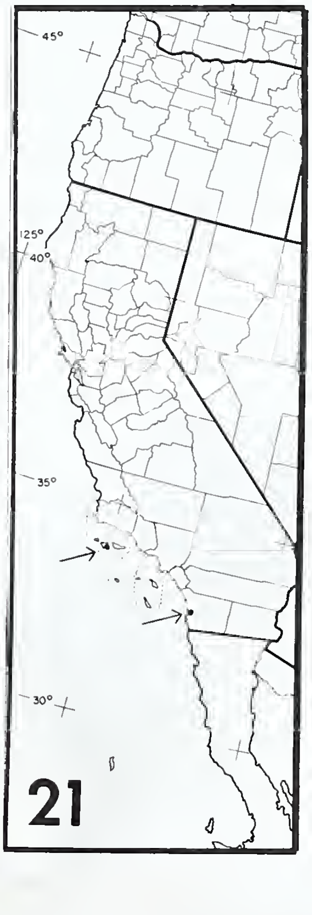

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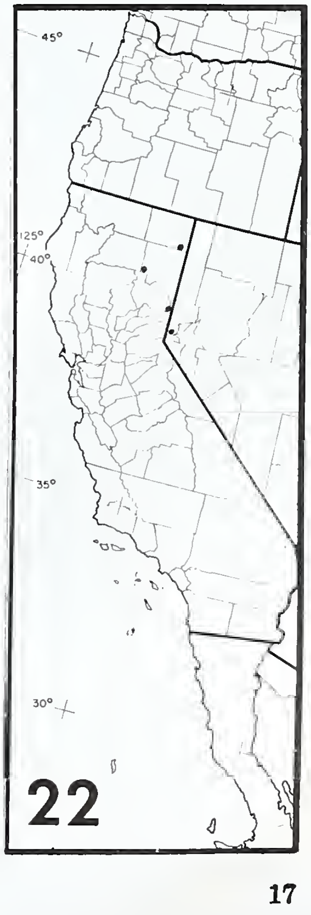

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Cooks Peak, Luna County, in southwestern New Mexico. The typical variety of Arizona cypress is known from 9 or more groves within 4 counties in southeastern Arizona, all in public ownership. Most of these groves are within divisions of the Coronado National Forest, including Chiricahua Mountains (2 groves), Dragoon Mountains, Winchester Mountains, Santa Catalina Mountains, and Galiuro Mountains including Galiuro Wilderness. Chiricahua National Monument, also in the mountains of the same name, contains fine stands of large cypress trees including three small Natural Areas for this species: East Picket Park (No. 141), West Picket Park (No. 136), and Far West Picket Park (No. 152). Another grove is within Saguaro National Monument in Rincon Mountains. A large cypress forest on the Apache National Forest north of Clifton in Greenlee County, the vicinity of the type locality of the species, is worthy of special protection. More common in northern Mexico.

29 G. Arizona smooth cypress, *Cupressus arizonica* var. *glabra* (Sudw.) Little (*C. glabra* Sudw.). This rare variety is known from at least 6 areas within 4 National Forests and 4 counties of central Arizona. The Coconino National Forest has cypress stands in Oak Creek Canyon, a recreation area easily accessible along highways, and in Casner Canyon Research Natural Area, recently designated for this tree. Also within Sycamore Canyon Primitive Area on the Coconino, Kaibab, and Prescott National Forests. The Tonto National Forest has cypress groves within Mazatzal and Superstition Wildernesses and another on Sierra Ancha within Sierra Ancha Experimental Forest.

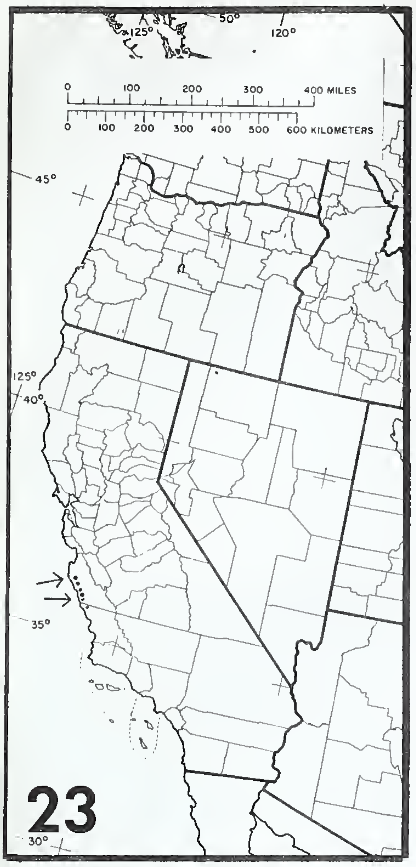
29 N. Piute cypress, *Cupressus arizonica* var. *nevadensis* (Abrams) Little (*C. nevadensis* Abrams). Rare and restricted to 9 or more groves in Piute Mountains and vicinity, and Kern and Tulare Counties, south central California. Piute Cypress Botanical and Natural Area (No. 240) in Kern County, California, contains trees within the Bakersfield District of the Bureau of Land Management and the Sequoia National Forest. The Bodfish Botanical Area on this National Forest gives additional protection.

29 S. Cuyamaca cypress, *Cupressus arizonica* var. *stephensonii* (C. B. Wolf) Little (*C. stephsonii* C. B. Wolf). This very rare variety (or species), the rarest of the named cypresses, is known from a single grove in Cuyamaca Mountains, San Diego County, southern California, and may be classed as endangered. This stand less than 1 mile long is partly within the Cleveland National Forest and partly within Cuyamaca Rancho State Park and thus is doubly protected (Little 1970, p. 437–440, fig. 2–4). Some trees were killed by a fire in 1950, but this area escaped damage by the extensive devastating burns during September 1970. Cultivation of trees elsewhere would be a precaution against extinction by fire.

30. Modoc cypress, *Cupressus bakeri* Jeps., also called Baker cypress and Siskiyou cypress. Known from 7 or more groves in 4 counties of northern California and 3 or more stands in 2 counties of southwestern Oregon, all within 4 National Forests and the Public Domain under the Bureau of Land Management. The Bureau of Land Management has established for this species the Baker Cypress Natural Area (No. 218) and Timbered Crater Baker Cypress Natural Area, both in Siskiyou and Modoc Counties, California. The Burney Springs Grove is on the Lassen National Forest in eastern Shasta County. Additional stations have been recorded near Seiad Creek, Siskiyou Mountains, and Goose Nest Mountain, both on Klamath National Forest in Siskiyou County, and 2 stands have been recorded on the Greenville District of the Plumas National Forest in Plumas County. In southwestern Oregon there are a few groves in Josephine County including Miller Lake Grove in Siskiyou Mountains, Rogue River National Forest. The northernmost locality of cypress in the New World is the Flounce Rock Grove of the Bureau of Land Management within the Rogue River National Forest in northeastern Jackson County.

31. Gowen cypress, *Cupressus goveniana* Gord. In the broad sense this species consists of 3 very rare geographic varieties (or species). All are highly susceptible to the cypress canker disease caused by a fungus (*Coryneum*

Plate VIII. California miscellaneous conifers. Figure 23.—bristlecone fir, *Abies bracteata.* Figure 24.—Port-Orford-cedar, *Chamaecyparis lawsoniana.* Figure 25.—Brewer spruce, *Piecea breweriana.* Figure 26.—bigcone Douglas-fir, *Pseudotsuga macrocarpa.* Figure 27.—giant sequoia, *Sequoiadendron giganteum.* Figure 28.—California torreya, *Torreya californica.*



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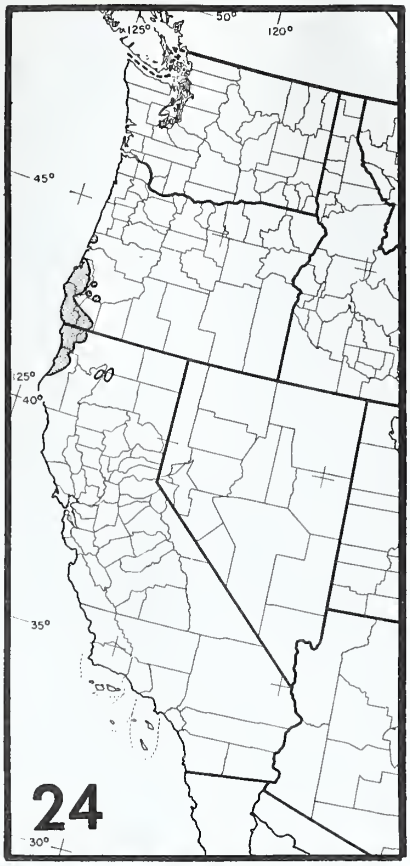

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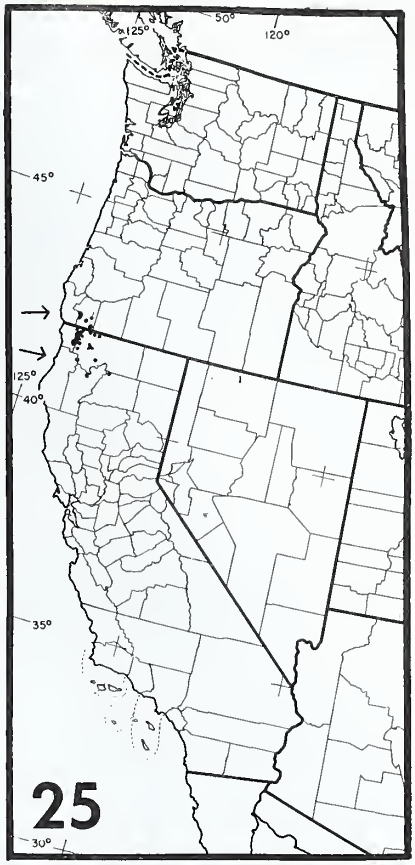

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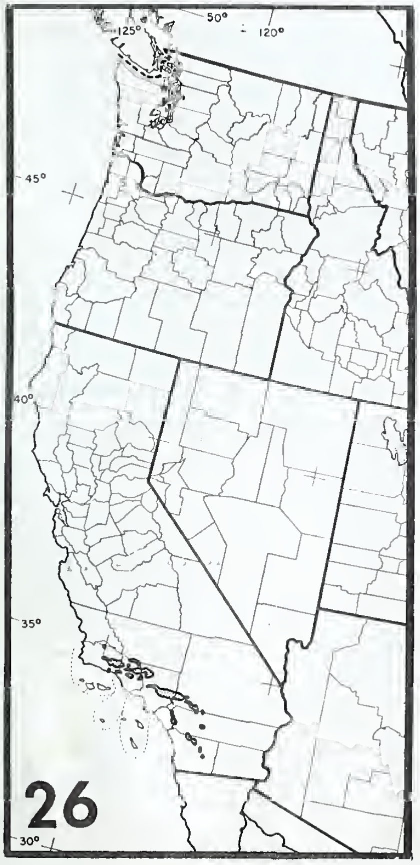

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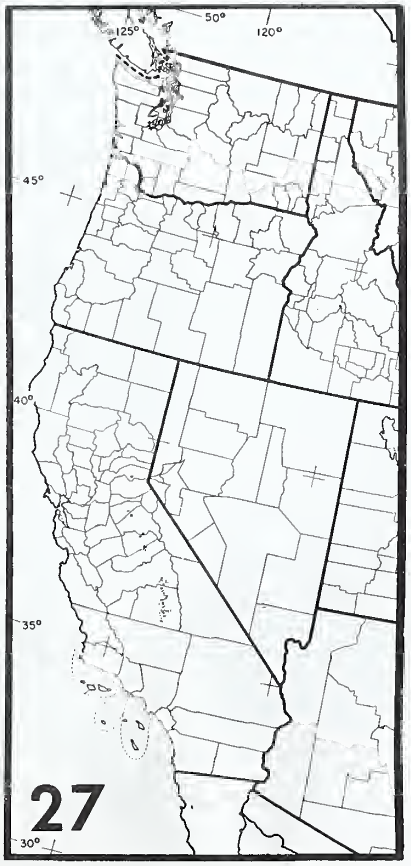

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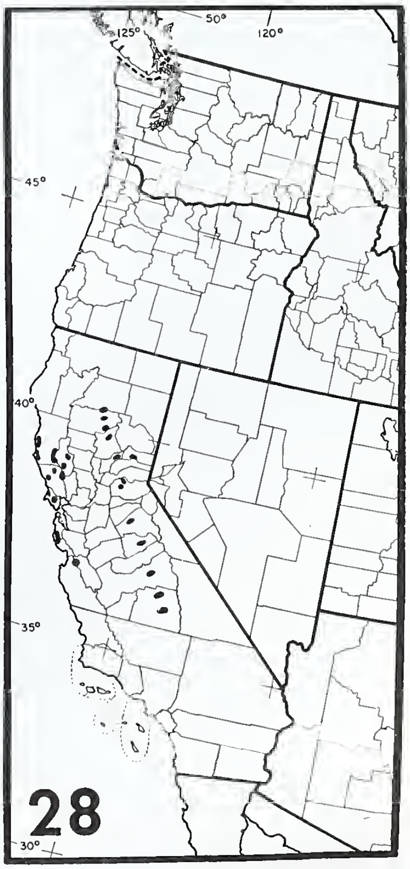

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cardinale) and are not recommended for planting in California.

31 G. Gowen cypress (typical), *Cupressus goveniana* Gord. var. *goveniana*. This variety (or species in the narrow sense) is very rare and known from only 2 groves 6 miles apart—Huckleberry Hill and Gibson Creek, both along the Pacific Ocean near Carmel, Monterey County, central California. Both areas were endangered until recently but now are protected. The S. F. B. Morse Botanical Reserve of 80 acres at the first locality has been set aside by the Del Monte Properties Co. The second area has become a part of Point Lobos Reserve, though not near the main part of the park.

31 A. Santa Cruz cypress, *Cupressus goveniana* var. *abramsiana* (C. B. Wolf) Little (*C. abramsiana* C. B. Wolf). Endangered. Very rare and confined to 4 localities in Santa Cruz Mountains near the coast in central California, including Bonnie Doon and Eagle Rock in Santa Cruz County. Much of the Butano Ridge Grove is owned by San Mateo County. Classed as endangered.

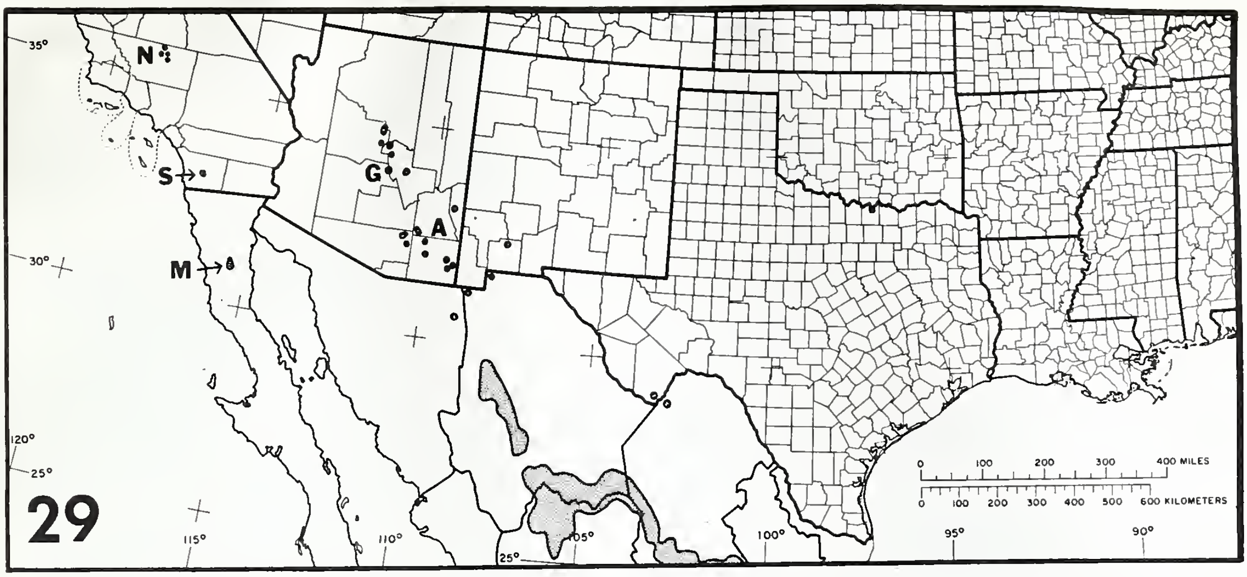
31 P. Mendocino cypress, *Cupressus goveniana* var. *pigmaea* Lemm. *(C. pygmaea* (Lemm.) Sarg). Very rare and restricted to 3 coastal areas in Mendocino County and northwestern Sonoma County, northwestern California—from near Fort Bragg to Mendocino City, including the Mendocino White Plains or Pine Barrens near Anchor Bay. Large trees were cut for lumber many years ago. In at least two State Parks, registered National Natural Landmark in Jackson State Forest, and University of California Natural Area. Not classed as endangered, though perhaps additional preserves would be desirable.

32 F. Tecate cypress, *Cupressus guadalupensis* S. Wats. var. *forbesii* (Jeps.) Little (*C. forbesii* Jeps.). Also accepted as a separate species but closely related to Guadalupe cypress (typical), *C. guadalupensis* var. *guadalupensis* (fig. 32 G), which is native only on Guadalupe Island off the Pacific Coast of Baja California, Mexico. Tecate cypress is rare in several groves in Orange and San Diego Counties, southern California, mostly near the Mexican border; also on the mainland of northwestern Baja California. The Otay Mountain Grove is within the Otay Mountain Natural Area (No. 181) in southern San Diego County, under Bureau of Land Management. The Guatay Mountain Grove is adjacent to Guatay Campground 1 mile west of Guatay Post Office on the Cleveland National Forest in San Diego County. These trees are visible near the south side of U. S. Highway 80 about 40 miles east of San Diego. The Sierra Peak Grove in the extreme north end of Santa Ana Mountains, Orange County, may be partly within this National Forest also. Another stand is on Mount Tecate along the Mexican border.

33. MacNab cypress, *Cupressus macnabiana* A. Murr. (Plate III.) This is the most widely distributed cypress in California. It is known from more than 30 grooves in 13 counties of the northern part of the State, from Shasta County south through Sierra Nevada foothills to Amador County, and from Trinity County south through Coast Ranges to Sonoma County. The Mendocino National Forest has this species within Frenzel Creek Research Natural Area in Colusa County and may include a grove near Bartlett Springs in Lake County.

34. Monterey cypress, *Cupressus macrocarpa* Hartw. (Plate III.) Very rare as a native tree in 2 groves at Point Lobos and Point Cypress near Monterey and Carmel along the windswept Pacific Coast in Monterey County, central California. The former is within Point Lobos Reserve and the latter is protected within Del Monte Forest. However, the trees are commonly planted over Monterey Peninsula, including city streets and lots and in canyons away from the coast. Monterey cypress is no longer recommended for California because of high susceptibility to the cypress canker disease caused by

Plate IX. Cypresses, the entire natural range of the genus in the United States. Figure 29.—Arizona cypress, *Cupressus arizonica*; 29 A, Arizona rough cypress, var. *arizonica*; 29 G, Arizona smooth cypress, var. *glabra*; 29 N, Piute cypress, var. *nevadensis*; 29 S, Cuyamaca cypress, var. *stephensonii*; 29 M, San Pedro Mártir cypress, var. *montana*. Figure 30.—Modoc cypress, *Cupressus bakeri*. Figure 31.—Gowen cypress, *Cupressus goveniana*; 31 G, Gowen cypress (typical), var. *goveniana*; 31 A, Santa Cruz cypress, var. *abramsiana*; 31 P, Mendocino cypress, var. *pigmaea*. Figure 32 F.—Tecate cypress, *Cupressus guadalupensis* var. *forbesii*; 32 G, Guadalupe cypress (typical), var. *guadalupensis*. Figure 33.—MacNab cypress, *Cupressus macnabiana*. Figure 34.—Monterey cypress, *Cupressus macrocarpa*. Figure 35.—Sargent cypress, *Cupressus sargentii*.



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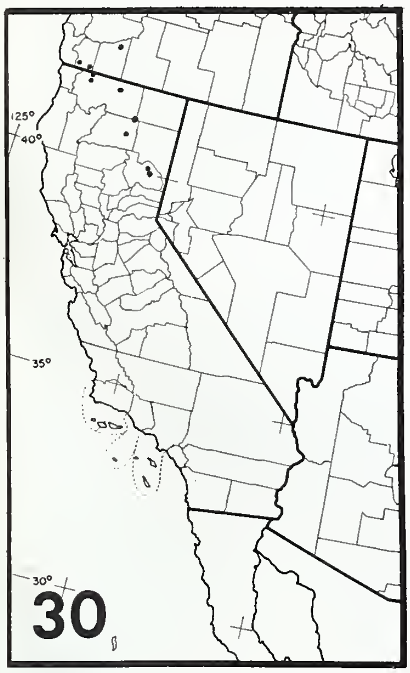

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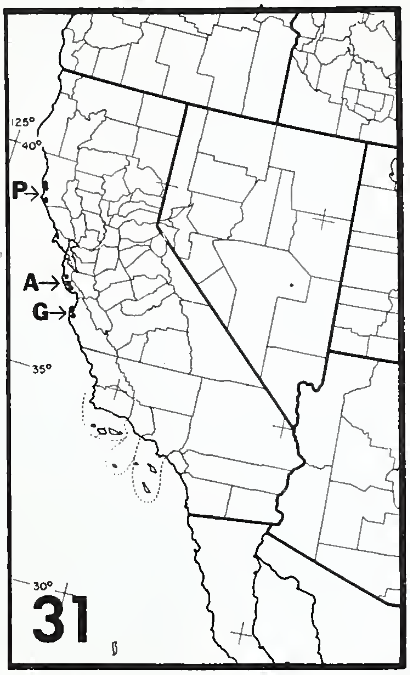

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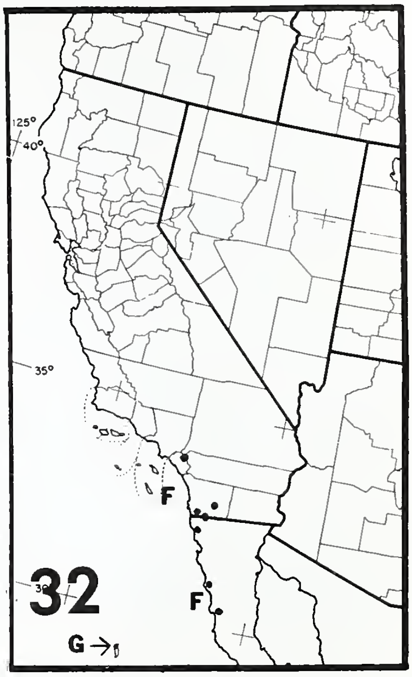

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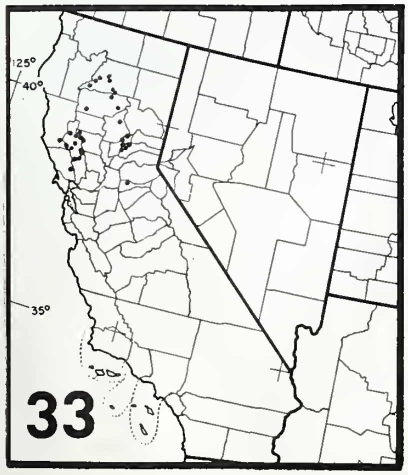

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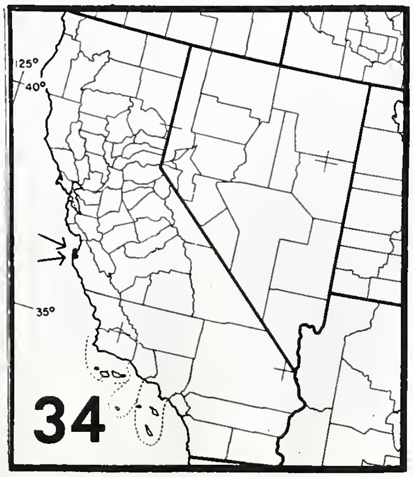

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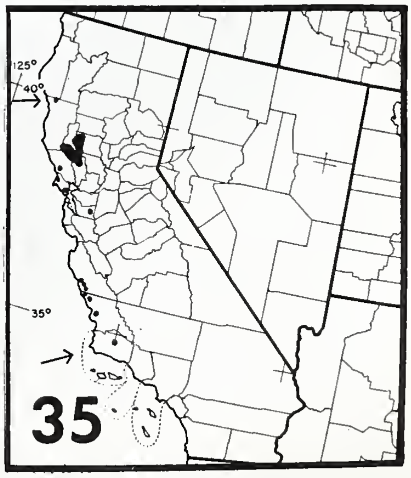

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TABLE 1.—Distribution of rare and local conifers in preserves; species numbers correspond to those in text and to figures (maps) in plates IV-IX.

Species No.	Name	Endangered	National Forests	National Parks and Monuments	BLM Natural Areas	State Parks	Other Preserves
	SOUTHERN APPALACHIANS						
1.	Fraser fir, *Abies fraseri*		4	2		1	
2.	Carolina hemlock, *Tsuga caroliniana*		5	1			
	FLORIDA						
3.	Sand pine, *Pinus clausa*		1				
4.	Florida yew, *Taxus floridana*	X				1	
5.	Florida torreya, *Torreya taxifolia*	X				1	
	ROCKY MOUNTAINS						
6.	Subalpine larch, *Larix lyallii*		12	2			
7.	Bristlecone pine, *Pinus aristata*		17	2	2		
	TEXAS						
8.	Ashe juniper, *Juniperus ashei*		2	1			
9.	Pinchot juniper, *Juniperus pinchotii*		1	1		1	
10.	Drooping juniper, *Juniperus flaccida*			1			
11.	Montezuma baldcypress, *Taxodium mucronatum*						
	NEW MEXICO AND ARIZONA						
12.	Mexican pinyon, *Pinus cembroides*		3	2			
13.	Apache pine, *Pinus engelmannii*		1				
14.	Chihuahua pine, *Pinus leiophylla* var. *chihuahuana*		3				
15.	Southwestern white pine, *Pinus strobiformis*		7	1			
	CALIFORNIA PINES						
16.	Foxtail pine, *Pinus balfouriana*		6	2			
17.	Coulter pine, *Pinus coulteri*		4				
18.	Bishop pine, *Pinus muricata*						1
19.	Parry pinyon, *Pinus quadrifolia*		2				
20.	Monterey pine, *Pinus radiata*						1
21.	Torrey pine, *Pinus torreyana*					1	
22.	Washoe pine, *Pinus washoensis*		3	1			
	CALIFORNIA MISCELLANEOUS CONIFERS						
23.	Bristlecone fir, *Abies bracteata*		1				
24.	Port-Orford-cedar, *Chamaecyparis lawsoniana*		6		1		
25.	Brewer spruce, *Picea breweriana*		5		1		
26.	Bigcone Douglas-fir, *Pseudotsuga macrocarpa*		4				
27.	Giant sequoia, *Sequoiadendron giganteum*		4	3		1	2
28.	California torreya, *Torreya californica*		8	3			

TABLE 1.—Distribution of rare and local conifers in preserves; species numbers correspond to those in text and to figures (maps) in plates IV-IX.—continued

Species No.	Name	Endangered	National Forests	National Parks and Monuments	BLM Natural Areas	State Parks	Other Preserves
	CYPRESSES						
29.	Arizona cypress, *Cupressus arizonica*						
29A.	Arizona rough cypress, var. *arizonica*		2	3			
29G.	Arizona smooth cypress, var. *glabra*		4				
29N.	Piute cypress, var. *nevadensis*		1		1		
29S.	Cuyamaca cypress, var. *stephensonii*	X	1			1	
30.	Modoc cypress, *Cupressus bakeri*		4		2		
31.	Gowen cypress, *Cupressus goveniana*						
31G.	Gowen cypress (typical), var. *goveniana*						2
31A.	Santa Cruz cypress, var. *abramsiana*	X					1
31P.	Mendocino cypress, var. *pigmaea*					2	2
32.	Tecate cypress, *Cupressus guadalupensis* var. *forbesii*		1		1		
33.	MacNab cypress, *Cupressus macnabiana*		1				
34.	Monterey cypress, *Cupressus macrocarpa*						2
35.	Sargent cypress, *Cupressus sargentii*		2		1	1	
	Totals[1]	4	26	14	7	9	5

[1] Number of species out of 35, omitting varieties; not areas.

a fungus (*Coryneum cardinale*). However, this species is widely grown in other parts of the world for ornament and timber and is not endangered.

35. Sargent cypress, *Cupressus sargentii* Jeps. This is the second most widely distributed cypress in California. It is known from about 20 groves in 10 counties confined to the Coast Ranges from Mendocino County to Santa Barbara County. The Mendocino National Forest has groves within Frenzel Creek Research Natural Area in Colusa County and in Lake County. Cuesta Ridge Botanical Area was established for this species in Santa Lucia Mountains in San Luis Obispo County within Los Padres National Forest. The southernmost locality, Zaca Peak, San Rafael Mountains, is within the same National Forest. Mount Tamalpais State Park, Marin County. Also Cedar Roughs Natural Area (No. 224), Napa County, under Bureau of Land Management.

Alaska

The 14 species of conifers native in Alaska reach their northern limit there. However all range southward across Canada to some of the contiguous United States, and thus are not endangered. All were mapped in the Atlas (Little 1971a) and further described and mapped in "Alaska Trees and Shrubs" (Viereck and Little 1972).

Three species are so rare and local in Alaska that they would not likely be seen without a special trip. They barely enter the southeastern part, where they could be classed as border or peripheral with reference to Alaska and adjacent Canada. Pacific yew, *Taxus brevifolia* Nutt., and Pacific silver fir, *Abies amabilis* (Dougl.) Forbes, are confined to the extreme southestern end on the South Tongass National Forest, the former to several islands and the latter also to the mainland. Subalpine fir, *Abies lasiocarpa* (Nutt.) Hook., reappears also near the northern end at Skagway on the North Tongass National Forest. Alaska groves may merit special preservation.

DISTRIBUTION OF RARE AND LOCAL CONIFERS IN PRESERVES

Table 1 summarizes the distribution in preserves of the 35 species of rare and local conifers native in continental United States (also varieties of cypress, *Cupressus*). The species are numbered as in the text and as figures in 1–35 (maps) in plates IV–IX.

Only one species, Montezuma baldcypress, *Taxodium mucronatum*, is not listed in a preserve of any kind. This border or peripheral species is common southward in Mexico and is not endangered.

Under each species the main preserves and other areas mentioned have been placed in columns in table 1 according to administration and kind of area. For some areas the inclusion of the rare species was incidental to other values, and the species may not be well represented. The totals at the bottom are numbers of species out of 35, not total areas. Smaller preserves within National Forests and National Parks, such as Research Natural Areas, are increasing in numbers and have not been tabulated. Further information on the occurrence of conifers within western National Parks has been summarized by Bailey and Bailey (1941).

In summary, 26 of the 35 species, as well as 3 additional varieties of cypress, are within National Forests, and 19 of the 26 are further protected within special areas. Also, 14 of the 35 are preserved within National Parks and Monuments, 7 within Natural Areas of the Bureau of Land Management, 9 within State Parks, and 5 within other preserves.

Table 1 and text may be helpful in showing the rare species in need of further protection in planning the establishment of additional preserves. For example, a few rare species are within National Forests but not also in a Research Natural Area or Botanical Area. Likewise, a few rare species on privately owned lands could be protected further through the purchase of suitable tracts by conservation organizations. Also, the seeds of certain rare species could be collected and distributed for propagation elsewhere in forests, parks, arboreta, and botanical gardens as a precaution.

ENDANGERED SPECIES

Fortunately, only a few species of the rare and local native conifers can be classed as endangered at present. According to table 1, most of these are protected within preserves of two or more agencies and not threatened with extinction. The column "Endangered" in table 1 indicates only the 2 very rare Florida species and 2 local cypress varieties (or species) listed below:

4. Florida yew, *Taxus floridana*
5. Florida torreya, *Torreya taxifolia*
29S. Cuyamaca cypress, *Cupressus arizonica* var. *stephensonii*
31A. Santa Cruz cypress, *Cupressus goveniana* var. *abramsiana*

SUMMARY

Thirty-five of the 96 species of conifers native in continental United States, more than one-third, are trees of rare or local distribution. Fortunately, only a few are endangered or threatened with extinction at present. This report is the first of a series on the rare and local native trees of the United States.

The range of each of the 35 species is summarized on an individual map. A table shows the extent of preservation and distribution in public forests, parks, and other preserves, also which species are endangered. The description for each species includes range, location of occurrence, rarity, forest type, and information of special interest. The trees needing more protection are indicated.

The 35 species may be grouped geographically as follows: Southern Appalachians, 2; Florida, 3; Rocky Mountains, 2; Texas, 4; Arizona and New Mexico, 4; and California, 20. Six are border or peripheral species whose range is mainly Mexican. Twenty-six species, also 3 additional varieties (or species) of cypress, are within National Forests, 14 are within National Parks and Monuments, 7 within Natural Areas of the Bureau of Land Management, 9 within State Parks, and 5 within other preserves. The few endangered or threatened with extinction are: Florida yew *(Taxus floridana)*, Florida torreya *(Torreya taxifolia)*, and 2 varieties (or species) of cypress *(Cupressus)* in California.

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